



Dr. Ellen Leitinger

Research fellow in Astrophysics

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Research positions and education

2024 **Research Fellowship**
Member of the ERC funded Asterochronometry and StarDance projects
Galactic archaeology | Asteroseismology | Binary stars

University of Bologna & INAF Florence, Italy

Graduated 2024 **Ph.D. in Astrophysics**
Title: 'A Wide-Field View of Multiple Stellar Populations in 30 Galactic Globular Clusters'
Supervisors: A/Prof. Holger Baumgardt, Dr. Michael Hilker and Dr. Ivan Cabrera-Ziri
Globular clusters | Observational photometry | Multiple stellar populations | Stellar kinematics and dynamics

UQ, Australia & ESO, Germany

Graduated 2019 **Masters Degree in Astrophysics**
Title: 'Contributions of the MgII Emission Line in Reverberation Mapping of Active Galactic Nuclei'
Supervisors: Dr. Janie Hoorman and Prof. Tamara Davis
Thesis Grade: High Distinction [7/7]
AGN | Reverberation mapping | MCMC methods | Observational spectroscopy | Time series analysis

UQ, Australia

Research projects

Fellowship **Nitrogen-rich stars through the lens of asteroseismology**

Using a combination of APOGEE abundances and *Gaia* astrometry, I identified a sample of metal-poor Galactic field stars with chemical abundance patterns consistent with formation within globular clusters. Following up with asteroseismology from the *Kepler* mission, I discovered that most of the enriched stars are too young to have originated in globular clusters, challenging previous assumptions of their origins.

PhD **I. A wide-field view on multiple stellar populations in 30 Milky Way globular clusters**

Through the homogeneous analysis of HST and Johnsons-Cousins photometry with a large sample of 30 Galactic globular clusters, I photometrically classified the multiple stellar populations within each cluster and calculated their spatial distributions. I discovered that dynamically young GCs display a wide range of initial conditions - a result which challenges current formation theories.

PhD **II. The kinematics of 30 Milky Way globular clusters and the multiple stellar populations within**

Using the same photometric classifications of multiple populations as in the previous project, I combined proper motions and line-of-sight velocities to investigate the 3D kinematics. I determined the rotation, velocity dispersions and anisotropy of all stars in each cluster, as well as the individual populations.

Masters **The contribution of the MgII emission line in reverberation mapping of AGN**

Reverberation mapping is a common method for determining the masses of AGN using multi-epoch data, most commonly with the use of the H β emission line. I determined that the same analysis could be completed for higher redshift AGN $1 < z < 3$ using the MgII line, despite contamination from the surrounding Fe emission lines.

First author publications

- 'A Wide-Field View on Multiple Stellar Populations in 28 Milky Way Globular Clusters' - **E.I. Leitinger**, H. Baumgardt, I. Cabrera-Ziri, M. Hilker, E. Pancino
MNRAS, Volume 520, Issue 1, March 2023, Pages 1456–1480
- 'The kinematics of 30 Milky Way globular clusters and the multiple stellar populations within' - **E.I. Leitinger**, H. Baumgardt, I. Cabrera-Ziri, M. Hilker, J. Carbajo-Hijarrubia, M. Gieles, T.O. Husser, S. Kamman
Astronomy & Astrophysics, Volume 694, A184, 2025
- 'Nitrogen-rich stars are not necessarily old' - **E.I. Leitinger**, A. Miglio, J. Montalbán, D. Massari, A. Bragaglia, W.E. van Rossem, K. Brogaard, A. Mazzi, J.S. Thomsen
Astronomy & Astrophysics, submitted

Scholarships and awards

2022-2023	European Southern Observatory studentship	ESO, Germany
2022	First place poster presentation at the ASA Annual Scientific Meeting	ASA, Australia
2021	First place at the School of Mathematics and Physics poster day	UQ, Australia
2019-2024	Research training program scholarship	UQ, Australia
2019	Dean's award for academic excellence	UQ, Australia

Contributed talks and posters

2025	Poster Binaries workshop 2025	Florence, Italy
2025	Contributed talk Focusing strong lenses: star clusters and globular cluster progenitors at high redshift	Sexten, Italy
2025	Contributed talk & poster European Astronomical Society (EAS) Annual Meeting	Cork, Ireland
2025	Contributed talk Stars II - current challenges, upcoming solutions	Bologna, Italy
2024	Poster Resolved stellar populations from photographic plates to large surveys. A celebration of Peter B. Stetson's career in astronomy	Florence, Italy
2024	Contributed talk A lens on globular cluster nurseries: how to compare models with observations	Sexten, Italy
2023	Contributed talk ESO wine and cheese seminar	ESO, Germany
2023	Poster Two in a Million - The interplay between binaries and star clusters	ESO, Germany
2023	Contributed talk Star @ Lyon	Lyon, France
2023	Contributed talk A multi-wavelength view on GCs near and far: from JWST to the ELT	Sexten, Italy
2022	Contributed talk Star-Forming clumps and clustered starbursts across cosmic time	MIAPbP, Germany
2022	Poster ASA Annual Scientific Meeting	ASA, Australia
2021	Contributed talk and poster Mt Stromlo student seminar	Mt Stromlo, Australia
2021	Poster UQ SMP poster day	UQ, Australia
2021	Contributed talk European Astronomical Society (EAS) Annual Meeting	Virtual
2020	Contributed talk 1st Australian BlueMUSE Workshop	Virtual

Organising committees and scientific outreach

2025	LOC 'Binaries workshop'	Florence, Italy
2025	LOC 'Haydn mission 1st scientific meeting'	Bologna, Italy
2025	LOC 'Stars II - current challenges, upcoming solutions' conference	Bologna, Italy
2023	LOC 'Two in a Million - The interplay between binaries and star clusters' conference	ESO, Germany
2023	LOC 'Coordinated Surveys of the Southern Sky (CSSS)' conference	ESO, Germany
2023	Organiser Weekly 'Resolved stellar populations' meeting	ESO, Germany
2023	Organiser Weekly 'Galaxy evolution coffee' meeting	ESO, Germany
2023	Organiser Weekly 'Informal discussion' meeting	ESO, Germany
2023	Organiser Weekly science department social gathering	ESO, Germany
2022	Organiser/Supervisor UQ Junior Physics Odyssey (JPhO)	UQ, Australia
2020	Organiser Weekly 'Star clusters and galaxies' Meeting	UQ, Australia
2019	Communications Officer UQ Physics Club 'PAIN'	UQ, Australia
2019	Supervisor Work experience program	UQ, Australia
2018-2019	Live Science Show Demonstrator 'Demo Troupe'	UQ, Australia

Observing proposals

LBT 2025B Proposal	(PI) 'Ejected or paired? Unveiling the origin of young Nitrogen-rich stars in the Galactic field' [Accepted]	
CAT 2023B Proposal	(CoI) 'Kinematics of multiple populations in NGC5024' [Accepted with A priority] (Program ID 50-GTC46/23B)	
ESO P109 Proposal	(CoI) 'Reticulum - a crucial system to probe the universality of the IMF' [Accepted with A priority] (Program ID 109.23EQ)	

Teaching assistant

Undergraduate courses

2018-2022	Numerical Methods in Computational Science (COSC2500/7500) Numerical analysis, linear algebra, solution of equations, and differential equations using Matlab and C++.	UQ, Australia
2019-2022	Electromagnetism and Modern Physics (PHYS1002) Electromagnetism, relativity, quantum physics and laboratory experiments.	UQ, Australia
2019-2022	Physical Basis of Biological Systems (PHYS1171) Forces and motion, elasticity and fluids, thermodynamics, electricity and biomedical imaging.	UQ, Australia
2019-2022	Theory and Practice in Science (SCIE1000) Mathematical and analytical models, introduction to the scientific method, coding in Python and ethics in science.	UQ, Australia
2018-2021	Physics Laboratory Assistant Preparation of all undergraduate physics laboratory apparatus throughout each academic semester.	UQ, Australia